

Demonstration of Autonomous Navigation for Deep Space CubeSat



Completed Technology Project (2015 - 2016)

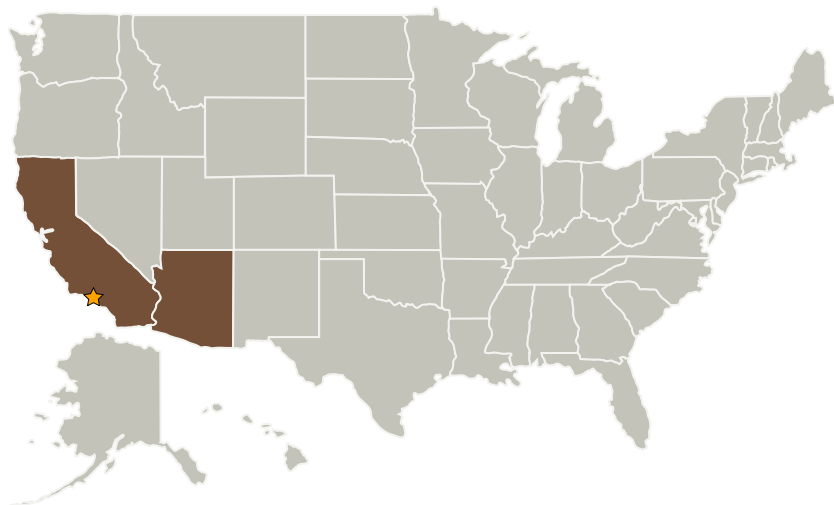
Project Introduction

Develop a testbed to test vision-based autonomous navigation algorithms that emulates the capabilities of JPL's reference 6U CubeSat Flight system. Perform an end-to-end demonstration of autonomous navigation in CubeSat-relevant environment. Assess the applicability of IntelliCam camera for autonomous navigation and required calibration... Mount Intellicam on Table Mountain Observatory and image asteroids against star backgrounds, process images with automated software to obtain star and asteroid centroids, Assess accuracy achievable by camera and software, run AutoNav on Intellicam testbed using realistic, simulated images with error characteristics from TMO data, demonstrate end-to-end navigation performance

Anticipated Benefits

Opportunity for demonstration on upcoming deep space CubeSat mission (e.g., AES' NEAScout). Alternative is to pursue demonstration as part of the game changing program (e.g., fly on university-led CubeSat mission in low Earth orbit)

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Center Innovation Fund: JPL CIF

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Arizona State University-Tempe(ASU)	Supporting Organization	Academia	Tempe, Arizona

Primary U.S. Work Locations

Arizona	California
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Project Website:

<https://www.nasa.gov/directorates/spacetech/home/index.html>

Project Management

Program Director:

Michael R Lapointe

Program Manager:

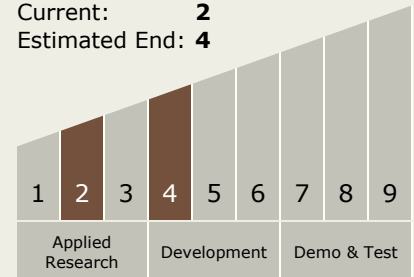
Fred Y Hadaegh

Principal Investigator:

Julie C Castillo

Technology Maturity (TRL)

Start: 2
 Current: 2
 Estimated End: 4



Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
 - TX17.2 Navigation Technologies
 - TX17.2.1 Onboard Navigation Algorithms